

WEST

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May 9, 2000

TITLE: Laminate for sliding element with good adhesion of resin sliding layer to metal substrate - has sliding layer based on polyvinylidene fluoride filled with poly:tetra:fluoro:ethylene, useful for lubricated or unlubricated bearing

PATENT-ASSIGNEE:

CODE

GLYC

FEDM

January 31, 1996

1996DE-1003353

PATENT-FAMILY	PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC	
	JP 20000505527	May 9, 2000	N/A	013	F16C033/20 W	August 7, 1997 N/A 006 B32B015/08
	DE 19603353 A1	August 7, 1997	G	014	F16C033/20	
	WO 9728380 A2	September 18, 1997	N/A	000	B32B015/08	
	WO 9728380 A3	November 18, 1998	G	000	F16C033/20	
	EP 877867 A2	April 13, 1999	N/A	000	F16C033/20	
	BR 9707324 A	October 27, 1999	G	000	F16C033/20	
	EP 877867 B1	December 2, 1999	N/A	000	F16C033/20	
	DE 59700616 G	April 1, 2000	N/A	000	F16C033/20	
	ES 2142151 T3					

DESIGNATED-STATES: AT BR JP KR US AT BE CH DE DK ES FI FR GB GR IE IT LU MC NL PT
SE DE ES FR GB IT DE ES FR GB IT

CITED-DOCUMENTS:DE 2935205; DE 3301167

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	APPL-DESCRIPTOR
JP2000505527W	January 23, 1997	1997JP-0527235	N/A
JP2000505527W	N/A	WO 9728380	Based on
JP2000505527W	January 23, 1997	1997WO-DE00169	N/A
DE	January 23, 1997	1997EP-0915268	N/A
WO 9728380A2	N/A	WO 9728380	Based on
WO 9728380A3	January 23, 1997	1997BR-0007324	N/A
EP 877867A2	January 23, 1997	1997WO-DE00169	N/A
EP 877867A2	N/A	WO 9728380	Based on
EP 877867A2	January 23, 1997	1997EP-0915268	N/A
BR 9707324A	January 23, 1997	1997WO-DE00169	N/A
BR 9707324A	N/A	WO 9728380	Based on
BR 9707324A	January 23, 1997	1997DE-0500616	N/A
EP 877867B1	January 23, 1997	1997EP-0915268	N/A
EP 877867B1	January 23, 1997	1997WO-DE00169	N/A
EP 877867B1	N/A	EP 877867	Based on
DE 59700616G	N/A	WO 9728380	Based on
DE 59700616G	January 23, 1997	1997EP-0915268	N/A
DE 59700616G	N/A	EP 877867	Based on
DE 59700616G			
DE 59700616G			
ES 2142151T3			
ES 2142151T3			

INT-CL (IPC): B32B 15/08; B32B 15/18; B32B 15/20; B32B 27/28; B32B 27/30; C08J 5/16; C08L 27/16; C08L 27/18; F16C 33/20

ABSTRACTED-PUB-NO: DE 19603353A
BASIC-ABSTRACT:

In a laminate for sliding elements with a metal substrate layer and resin sliding layer with polytetrafluoroethylene (PTFE) as filler in a polyvinylidene fluoride (PVDF) matrix, the PVDF fraction is 60-95 vol.% and the rest consists of PTFE and optionally other component(s) with a density < 7 g/cm³.

Also claimed is a method of making the laminate.

Preferably the material contains 70-88 vol.% PVDF, 12-30 vol.% PTFE and not more than 5 vol.% of other component(s). The other components are selected from completely or partly aromatic polymers, e.g. PI (polyimide), PAI (polyamide-imide), polyamide, PPS (polyphenylene sulphide), PES (polyether sulphone), PEEK (polyether-ether-ketone), PSU, polyester, carbon variants, e.g. graphite, carbon black, carbon fibres or coke, or compounds, e.g. molybdenum disulphide (MoS₂), boron nitride (BN), calcium fluoride (CaF₂) or calcium carbonate (CaCO₃). The sliding layer is 20-400 µm thick. The substrate material has a surface roughness Rz > 10 µm, especially > 30 µm. It consists of steel,

stainless, steel, a copper alloy, aluminium, an aluminium alloy or a laminated combination of these.

USE - The laminate is used for producing sliding elements for lubricated and unlubricated units (claimed).

ADVANTAGE - The resin layer has good adhesion to the metal and avoids the usual drawbacks of bearing layers based on PVDF, e.g. the use of toxic metals, metal compounds or solvent or even evolution of toxic decomposition products.

ABSTRACTED-PUB-NO: EP 877867B
EQUIVALENT-ABSTRACTS:

In a laminate for sliding elements with a metal substrate layer and resin sliding layer with polytetrafluoroethylene (PTFE) as filler in a polyvinylidene fluoride (PVDF) matrix, the PVDF fraction is 60-95 vol.%

and the rest consists of PTFE and optionally other component(s) with a density < 7 g/cm³.

Also claimed is a method of making the laminate.

Preferably the material contains 70-88 vol.% PVDF, 12-30 vol.% PTFE and not more than 5 vol.% of other component(s). The other components are selected from completely or partly aromatic polymers, e.g. PI (polyimide), PAI (polyamide-imide), polyamide, PPS (polyphenylene sulphide), PES (polyether sulphone), PEEK (polyether-ether-ketone), PSU, polyester, carbon variants, e.g. graphite, carbon black, carbon fibres or coke, or compounds, e.g. molybdenum disulphide (MoS₂), boron nitride (BN), calcium fluoride (CaF₂) or calcium carbonate (CaCO₃). The sliding layer is 20-400 µm thick. The substrate material has a surface roughness Rz > 10 µm, especially > 30 µm. It consists of steel, stainless, steel, a copper alloy, aluminium, an aluminium alloy or a laminated combination of these.

USE - The laminate is used for producing sliding elements for lubricated and unlubricated units (claimed).

ADVANTAGE - The resin layer has good adhesion to the metal and avoids the usual drawbacks of bearing layers based on PVDF, e.g. the use of toxic metals, metal compounds or solvent or even evolution of toxic decomposition products.

CHOSEN-DRAWING: Dwg.0/1

DERWENT-CLASS: A14 A88 P73 Q62
CPI-CODES: A04-E08B; A04-E10B; A08-M09B; A08-R08B; A11-B05E; A12-H03;

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L39: Entry 1 of 9

File: DWPI

Jun 27, 1999

DERWENT-ACC-NO: 2000-327396
DERWENT-WEEK: 200028
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TITLE: Self-lubricating antifriction material

INVENTOR: MELNIKOV, V G; MOLODTSOVA, N I ; SMIRNOV, A S

PATENT-ASSIGNEE:

ASSIGNEE
EKOKHIMMASH CO LTD

CODE
EKOKR

PRIORITY-DATA:

1998RU-0102864

February 4, 1998

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
RU 2132364 C1	June 27, 1999	N/A	000	C10M125/02

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	APPL-DESCRIPTOR
RU 2132364C1	February 4, 1998	1998RU-0102864	N/A

INT-CL (IPC): C10M 125/02; C10N 50/08; C10M 103/02; C10M 125/02; C10M 125/22; C10M 145/18

ABSTRACTED-PUB-NO: RU 2132364C

BASIC-ABSTRACT:

NOVELTY - Material comprises wt. %: coke, 10- 20; molybdenum disulfide, 5-10; epoxy resin, 5-10; and graphite, up to 100. Material has low friction coefficient of 0.055-0.083 and high bending strength of 0.32-0.51 MPa.

USE - Chemical industry.

ADVANTAGE - Improved properties of the self- lubricating friction material. 3 ex

ABSTRACTED-PUB-NO: RU 2132364C

EQUIVALENT-ABSTRACTS:

CHOSEN-DRAWING: Dwg.0/0

DERWENT-CLASS: A21 A97 H07

CPI-CODES: A05-A01E; A08-M03B; A12-W02; H07-G07;

WEST

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L41: Entry 2 of 3

File: DWPI

Jan 15, 1991

DERWENT-ACC-NO: 1991-367133
DERWENT-WEEK: 199150
COPYRIGHT 2000 DERWENT INFORMATION LTD

TITLE: Antifriction compsn. - contains poly-tetra:fluoroethylene, antifriction filler and silicate contg. prod. of reacting water glass, phenolphthalein, etc.

INVENTOR: BIRAN, V V; DETSUK, V S ; GALOV, S V

PRIORITY-DATA:
1987SU-4300755

August 24, 1987

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
SU 1620452 A	January 15, 1991	N/A	000	N/A

INT-CL (IPC): C08J 5/16; C08L 27/18

ABSTRACTED-PUB-NO: SU 1620452A
BASIC-ABSTRACT:

The compsn. contains (in pts.wt.): polytetrafluoroethylene 100, an antifriction filler (e.g. graphite, molybdenum disulphide, petroleum coke) 2-10 and silicate-contg. additive (I) 30-55.

(I) is obtd. by reacting following components taken in amts. (in pts.wt.): sodium water glass (of module 2.4-2.6 and density 1.4-1.45 g/cc) 100, phenolphthalein 0.1-1.0, epoxy-bisphenol A 35-75 20-30% aq. soln. of FeCl₃.6H₂O (per dry wt.) 42-50 and water 213-245.

Tests show that the articles made of the proposed compsn. have compressive strength 23-38 MPa, tensile strength 19-22 MPa, relative elongation 30-35%, impact strength 90-110 kJ/sq.m and friction coefft. (at 1.5 MPa load) 0.1, against 18-21.5 MPa, 13-15 MPa, 80-120%, 65 kJ/sq.m and 0.15-0.17, resp., for the results obtd. with the known compsn.

USE/ADVANTAGE - In the prodn. of e.g. friction bearings, working under high temp. properties: Improved physico-mechanical and antifriction . are obtd. Bul.2/15.1.91

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L38: Entry 4 of 7

File: DWPI

Dec 15, 1993

DERWENT-ACC-NO: 1994-116248

DERWENT-WEEK: 199414

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TITLE: Antifriction solid-lubricant material - contains additionally molybdenum di:sulphide, polytetra:fluoro-ethylene and carbon fibre to ensure lubricating effect at liq. nitrogen temp.

INVENTOR: KASPIN, V B; KUROV A YA, ; PSHENICHKIN, P A

PATENT-ASSIGNEE:

ASSIGNEE

IVIS ASSOC

CODE

IVISR

PRIORITY-DATA:

1991SU-5013851

August 1, 1991

PATENT-FAMILY:

PUB-NO

PUB-DATE

LANGUAGE

PAGES

MAIN-IPC

RU 2004582 C1

December 15, 1993

N/A

004

C10M161/00

APPLICATION-DATA:

PUB-NO

APPL-DATE

APPL-NO

APPL-DESCRIPTOR

RU 2004582C1

August 1, 1991

1991SU-5013851

N/A

INT-CL (IPC): C10M 161/00

ABSTRACTED-PUB-NO: RU 2004582C

BASIC-ABSTRACT:

Antifriction material is based on binder, graphite, Cu, Pb and Sn. Binder is represented by mixt. of furfuryl alcohol and prod. of condensation of phenol with formaldehyde, at wt. ratio 1:2, and material additionally contains molybdenum disulphide, polytetrafluoroethyl ene and carbon fibre, at ratio of components (in wt. %): molybdenum disulphide 40-45, graphite 7-9, polytetrafluoroethylene and carbon fibre at ratio of components (in wt. %) molybdenum disulphide 40-45, graphite 7-9, polytetrafluoroethylene 2-3, lead 2.0-2.5, tin 2.5-3.0, copper 1.3-2.5 carbon fibre 2.5-3.0 and balance binder as described above.

USE/ADVANTAGE - As solid lubricant for ball bearings working under extreme conditions of high and low temps. high humidity etc. Proposed antifriction solid lubricant preserves its lubricating properties at liq. nitrogen temp. and in nitrogen vapours medium.

ABSTRACTED-PUB-NO: RU 2004582C

EQUIVALENT-ABSTRACTS:

CHOSEN-DRAWING: Dwg.0/0

DERWENT-CLASS: A97 H07

CPI-CODES: A04-E08B; A05-C03A; A08-M03B; A08-R01; A08-R03A; A12-H03; A12-S08C; A12-S08D1; H07-B; H07-D;

WEST

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L41: Entry 2 of 3

File: DWPI

Jan 15, 1991

DERWENT-ACC-NO: 1991-367133

DERWENT-WEEK: 199150

COPYRIGHT 2000 DERWENT INFORMATION LTD

TITLE: Antifriction compsn. - contains poly-tetra:fluoroethylene, antifriction filler and silicate contg. prod. of reacting water glass, phenolphthalein, etc.

INVENTOR: BIRAN, V V; DETSUK, V S ; GALOV, S V

PRIORITY-DATA:

1987SU-4300755

August 24, 1987

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
SU 1620452 A	January 15, 1991	N/A	000	N/A

INT-CL (IPC): C08J 5/16; C08L 27/18

ABSTRACTED-PUB-NO: SU 1620452A

BASIC-ABSTRACT:

The compsn. contains (in pts.wt.): polytetrafluoroethylene 100, an antifriction filler (e.g. graphite, molybdenum disulphide, petroleum coke) 2-10 and silicate-contg. additive (I) 30-55.

(I) is obtd. by reacting following components taken in amts. (in pts.wt.): sodium water glass (of module 2.4-2.6 and density 1.4-1.45 g/cc) 100, phenolphthalein 0.1-1.0, epoxy-bisphenol A 35-75 20-30% aq. soln. of FeCl₃.6H₂O (per dry wt.) 42-50 and water 213-245.

Tests show that the articles made of the proposed compsn. have compressive strength 23-38 MPa, tensile strength 19-22 MPa, relative elongation 30-35%, impact strength 90-110 kJ/sq.m and friction coefft. (at 1.5 MPa load) 0.1, against 18-21.5 MPa, 13-15 MPa, 80-120%, 65 kJ/sq.m and 0.15-0.17, resp., for the results obtd. with the known compsn.

USE/ADVANTAGE - In the prodn. of e.g. friction bearings, working under high temp. properties: Improved physico-mechanical and antifriction . are obtd. Bul.2/15.1.91

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L35: Entry 34 of 40

File: DWPI

Jun 10, 1977

DERWENT-ACC-NO: 1977-52873Y

DERWENT-WEEK: 197730

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TITLE: Antifriction fluorinated copolymer based material - contg. carbon fibres
molybdenum disilphade and/or graphite for high speed heavy load use

PATENT-ASSIGNEE:

ASSIGNEE

ASAHI GLASS CO LTD

CODE

ASAG

PRIORITY-DATA:

1975JP-0145950

December 9, 1975

PATENT-FAMILY:

PUB-NO

PUB-DATE

LANGUAGE

PAGES

MAIN-IPC

JP 52069956 A

June 10, 1977

N/A

000

N/A

JP 81037260 B

August 29, 1981

N/A

000

N/A

INT-CL (IPC): C08K 3/04; C08K 7/06; C08L 27/12

ABSTRACTED-PUB-NO: JP52069956A

BASIC-ABSTRACT:

A fluorine contg. copolymer compsn. has excellent sliding property. It is prepd. using compsn. contg. (in wt.) fluorinated copolymer e.g., ethylene-tetrafluoro-ethylene, ethylene-trifluorochloroethylene copolymers 40-90; carbon fibre 5-40 and e.g., molybdenum disulphide and/or graphite 5-50.

The prod. is used in e.g., bearings, piston rings, gear, hopper, shooter, pump parts, slicer, valve parts, etc. As the compsn. has great critical PV value together with good abrasion coefficient and kinetic friction coefficient, it can be used as sliding material under high speed and heavy load.

ABSTRACTED-PUB-NO: JP52069956A

EQUIVALENT-ABSTRACTS:

DERWENT-CLASS: A14 A17 A88

CPI-CODES: A04-E10; A08-M03; A08-R03; A12-H03; A12-H10;

WEST



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L35: Entry 8 of 40

File: DWPI

Oct 16, 1996

DERWENT-ACC-NO: 1995-027837

DERWENT-WEEK: 199646

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TITLE: Solid lubricant - consists of lubricating substance, filler, corrosion proof agent and binder

PATENT-ASSIGNEE:

ASSIGNEE

CODE

IDEKURA T

IDEKI

YAMAKITA SANGYO KK

YAMAN

PRIORITY-DATA:

1993JP-0124615

April 30, 1993

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 2543819 B2	October 16, 1996	N/A	015	C10M171/00
JP 06313186 A	November 8, 1994	N/A	017	C10M171/00

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	APPL-DESCRIPTOR
JP 2543819B2	April 30, 1993	1993JP-0124615	N/A
JP 2543819B2	N/A	JP 6313186	Previous Publ.
JP06313186A	April 30, 1993	1993JP-0124615	N/A

INT-CL (IPC): C10M 169/04; C10M 171/00; C10N 10/02; C10N 10/06; C10N 10/12; C10N 20/00; C10N 20/06; C10N 30/06; C10N 30/08; C10N 30/12; C10N 40/02; C10N 50/08; C10N 70/00; C10M 103/00; C10M 103/02; C10M 103/06; C10M 105/70; C10M 107/54; C10M 125/00; C10M 125/20; C10M 125/24; C10M 125/28; C10M 145/20; C10M 169/04; C10M 103/00; C10M 105/70; C10M 107/00; C10M 107/54; C10M 125/00; C10M 169/04

ABSTRACTED-PUB-NO: JP06313186A

BASIC-ABSTRACT:

Solid lubricant consists of (A) lubricating substance, (B) filler, (C) corrosion proof agent and (D) binder and is mfd. by coagulating a compsn. consisting of 100 pts.wt. of lubricating substance and 1-150 pts.wt. of binder to form a composite material with physical properties, e.g. up to 0.5 of dynamic coefficient of friction and at least 1.0 Kg f.cm/cm² of Charpy impact strength new.

Solid lubricant or sliding apparatus, in which the lubricating substance consists of 60-97 wt.% of graphite and 3-40 wt.% of molybdenum disulphide or tungsten disulphide is new. Sliding apparatus or solid lubricant in which the filler is a kind or at least 2 kinds of ceramics fibre, glass fibre, whisker, carbon fibre or synthetic resin fibre which does not cause heat deformation is new.

ADVANTAGE - (a) Sliding appts., e.g. bearing which can keep precision lubrication for a long time and can be used for a long time at high temperature of 250-350 deg. C under metal corroding environment. (b) Directly acting guide bearing (e.g. linear guide) or bearing (e.g. ball screw). (c) Sliding appts. which can perform lubrication at low friction for a long time, when the sliding apparatus is used for civil engineering work under conspicuously corrosive condition.

for civil engineering work under conspicuously corrosive condition.

ABSTRACTED-PUB-NO: JP06313186A
EQUIVALENT-ABSTRACTS:

CHOSEN-DRAWING: Dwg.0/0

DERWENT-CLASS: A88 H07 L02
CPI-CODES: A12-H03; A12-W02A; H07-D; L02-H03; L02-H04;

WEST



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L38: Entry 5 of 7

File: DWPI

Mar 26, 1987

DERWENT-ACC-NO: 1987-087567

DERWENT-WEEK: 198713

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TITLE: Maintenance free laminated bearing with thin PTFE bearing layer - produced by rolling thicker film onto metal support to fill rough surface and sintering

INVENTOR: BICKLE, W; BRAUS, W

PATENT-ASSIGNEE:

ASSIGNEE

CODE

KOLBENSCHMIDT AG

SHMK

PRIORITY-DATA:

1985DE-3534242

September 26, 1985

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
DE 3534242 A	March 26, 1987	N/A	004	N/A
DE 3662616 G	May 3, 1989	N/A	000	N/A
DK 8604577 A	March 27, 1987	N/A	000	N/A
EP 223268 A	May 27, 1987	G	005	N/A
EP 223268 B	March 29, 1989	G	000	N/A
ES 2002767 A	October 1, 1988	N/A	000	N/A
JP 62075127 A	April 7, 1987	N/A	000	N/A

DESIGNATED-STATES: AT BE CH DE FR GB IT LI LU NL SE AT BE CH DE FR GB IT LI LU NL SE

CITED-DOCUMENTS: EP 163937; EP 5560

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	APPL-DESCRIPTOR
DE 3534242A	September 26, 1985	1985DE-3534242	N/A
EP 223268A	September 23, 1986	1986EP-0201642	N/A
ES 2002767A	September 25, 1986	1986ES-0002181	N/A
JP62075127A	September 25, 1986	1986JP-0227082	N/A

INT-CL (IPC): F16C 33/24

ABSTRACTED-PUB-NO: DE 3534242A

BASIC-ABSTRACT:

Maintenance-free laminated bearing material consists of a combination of a steel, bronze or high strength Al alloy support with a rough base layer, pref. a -.1-0.35 mm thick porous, sintered bronze, iron or Al alloy layer, and a bearing layer with a PTFE matrix, which also fills the depressions in the rough base layer and may contain 5-40 wt.% Pb, MoS₂, graphite, C fibres, glass, fibres, ceramic fibres, glass beads, hollow ceramic beads, BaSO₄, ZnS and/or Pb borosilicate to inhibit wear.

The novelty is that a 0.1-1 mm thick bearing layer is used, which is produced by rolling a 0.5-3 mm thick PTFE film and sintering.

ADVANTAGE - Supplementary machining by abrasion or fine turning e.g. to compensate for misalignment and/or present prevent noise, is possible, without affecting the esp. high pV value of 1.8 N.mm².m/s in long term operation and 3.6 N/mm².m/s short term, the permissible static specific load of 250 N/mm², sliding rate of 2 m/s, good bearing properties, low coefft. of friction and good thermal conductivity.

ABSTRACTED-PUB-NO: EP 223268B

EQUIVALENT-ABSTRACTS:

Process for producing a maintenance-free multilayer sliding bearing material, consisting of a combination of a metal backing made of steel, bronze or a high-strength aluminium alloy, provided with a rough primer layer, preferably a 0.1 to 0.35mm thick, porous sinter-bonded bronze layer, iron layer, or aluminium alloy layer, and a bearing layer consisting of a matrix of polytetrafluoroethylene (PTFE), with which material the valleys of the rough primer layer are also filled and which may also optionally contain friction-reducing and wear-inhibiting additives of lead, molybdenum disulphide, graphite, carbon fibres, glass fibres, ceramic fibres, glass spheres, hollow ceramic spheres, barium sulphate, zinc sulphide, lead borosilicate, individually or in combination in a quantity of 5 to 40% weight, characterised in that the PTFE, which has a grain size of not more than 35 micro-m, is moulded with an admixed extrusion assisting agent into a preform, said preform is extruded into a strip 1.5 to 5.0mm thick, the strip is formed into a sheet 0.5 to 3.0 mm thick by conditioning calendaring, the sheet, which is heated to 70 to 90 deg.C, is rolled on to the rough primer layer of the metal backing, which has been heated to 130 to 180 deg.C with a decrease in thickness to 0.1 to 1.0mm, and subsequently the PTFE is sintered by continuous heating to approximately 400 deg.C and maintaining at this temperature for a short time. (5pp)

CHOSEN-DRAWING: Dwg.0/1

DERWENT-CLASS: A14 A88 Q62

CPI-CODES: A04-E08B; A12-H03;